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Combat Crew

strategic air command

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MARCH 1979

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Preparedness . . .

Maj. Gen. Edwin A. Coy
Commander, 1st STRAD

It is axiomatic that throughout our lives our fortune or misfortune is largely determined by our degree of preparedness. Preparedness is not something that just happens — it must be planned for, actively sought, and worked toward on a continuing basis. We, in the military, are called upon by our country to maintain the highest degree of preparedness for the defense of the United States.

As I see it, preparedness may be viewed as having three essential parts analogous to a triangle, with each of its sides representing a single component. The first side is physical, the second mental, and the third side emotional. Subtract any of its components and the triangle (preparedness) ceases to exist.

Physical preparedness is synonymous with a strong structural foundation. During periods of adverse conditions, such as floods and earthquakes, the building with a sound foundation will weather the storm. Similarly, the individual who is physically fit will have the stamina to withstand long hours, stress, and other detrimental conditions.

Being physically fit does not just happen. It must be sought deliberately and worked at continuously. To provide us with opportunities for fitness, we have programs such as aerobics, individual or group competitive sports, and a host of special athletic activities. Physical preparedness is, of necessity, the first leg of the preparedness triangle because without it, it is difficult to be mentally or emotionally prepared.

The next leg of the preparedness triangle is mental. Mental preparedness encompasses a wide range of acts and attitudes and is apparent in the routine day-to-day tasks we perform. It is knowing all you can about your people and your job, and not just enough to get by. It is an openness of the mind, always questioning techniques and procedures with a view toward improving them, and not accepting things as they are because they have always been that way.

Mental preparedness is the capability to do the best job you possibly can even though you may disagree with that particular program. If you are mentally prepared, you are ready to confront problems, people and situations straight on. If you are not, you probably ignore problems, talk behind the backs of your supervisors and subordinates, and circumvent the difficult situations.

Mental preparedness is being able to stand up for your views and opinions in less than favorable circumstances. It is standing by your subordinates and your superiors when the going gets rough. However, that is only a part of it. On the other side of the coin is the mental toughness to be able to admit mistakes and then go out to correct them. It is taking firm but fair disciplinary action when necessary. If you are mentally prepared, your judgment and advice will be sought after by the people for whom you work and those who work for you.

Emotional preparedness, as the third leg of the triangle, is no less important than the physical and mental portions. During an emergency situation, even though you may be mentally able to see what needs to be done and physically capable of doing it, emotional preparedness will enable you to react positively and bring the emergency situation to a safe conclusion. Emotional preparedness allows us to deal effectively with setbacks, both in our personal and professional lives. It stems from a healthy state of mind nurtured by sound moral values. Even though we may have lost a battle, good emotional preparedness provides us the character to come back, put aside the loss, and eventually gain the victory.

Now is the time to assess your personal degree of preparedness. As combat crewmembers in SAC or anywhere else in the Air Force, it is all the more imperative that you ask yourself if you are physically, mentally and emotionally fit. Remember, the sum total of your preparedness can be no greater than the total of your physical, mental and emotional capacities. This is consistent with the whole man concept of developing all of our faculties. The future will belong to the individual and the nation that is prepared. Let that nation be America, and the future be ours through preparedness.★★

Combat Crew

Magazine of the Strategic Air Command - 29th Year of Publication

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IN THIS ISSUE

Climb to the Top 4
Safety First 8
OPS Update 10
Thunderstorm Avoidance 12
Big Instrument 19
ACE Topics 23
R&D Corner 24
Debrief 30

ON OUR COVER

Rotate . . . a KC-135 from the 170th Air Refueling Group starts another mission that will keep them at the top. See page four.

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COMBAT CREW is an internal publication of the Strategic Air Command with the sole purpose of promoting safety. The contents of this magazine are informative and not to be considered as directive in nature. Facts, testimony and conclusions of all mishaps printed herein may not be construed as incrimination under Article 31 of the Uniform Code of Military Justice. All names, dates and places used in conjunction with mishap stories are fictitous. Written permission must be obtained from Headquarters, Strategic Air Command, before any material may be reprinted by other than U.S. Air Force organizations. Use of funds for printing this publication has been approved by Hq. USAF, Distribution FX, controlled by IGFC. SAC units submit distribution requests through local PDO.

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Reaching the top of SAC's Hall of Fame can be impressive, yet to those who hold the honor it can represent something more. How does one . . .

Climb to

Amn Benita Simone
170th AREFG McGuire AFB

Achievement. You might say it is the difference between success and failure; or you might attribute it to personal discipline. According to a quote by Lt. General Bryan M. Shotts, former Fifteenth Air Force Commander, "The disciplined individual, squad, flight, etc. is the hallmark of the successful military unit." He also added, "positive achievement in every field of human endeavor is possible only when supported by massive doses of personal discipline."

Achievement and success can probably be traced to a number of factors. But to gain listing in the Hall of Fame as a unit class A mishap-free for over twenty-three years, certain success factors might be outstanding. To find out why the word *none* tops the list of the Hall of Fame, we went to McGuire Air Force Base to see for ourselves what lies behind this impressive achievement.

The 170th Air Refueling Group began its life as the 150th Air Transport Squadron at Newark Airport, New Jersey on 1 February 1956. It was flying C-46 aircraft. The unit, now an Air Transport Group with C-121 Constellations, moved to McGuire AFB on 1 July 1965. A few change of commands and aircraft later the group joined SAC in its present mission on 1 April 1977, flying the Boeing KC-135 Stratotanker. With the 170th current mission they are involved with the aerial refueling operation in the continental United States on a daily basis. This gives you a little background on what the 170th does, but still, why such an impressive record?

Some units who hold accident free records can partially attribute it to their base location and runway conditions, but certainly not McGuire.

McGuire AFB is noted for being one of the busiest corridors of air space in the world! In addition to being centered between the metropolis of New York and Philadelphia, McGuire AFB also controls general aviation aircraft from thirteen civilian satellite airports, resulting in a tremendous traffic volume. Due to the direction of the runway, severe crosswinds are a constant concern. Because of these and other conditions it makes for a more hazardous situation than normal. Add to that the voluminous air traffic and it is amazing how a perfect mishap-free record could be maintained. But let us dig deeper and maybe find those elements of success that so often escape discussion.

We may begin with the fact that the 170th AREFG, McGuire (NJANG) holds the record for accident free flight in Strategic Air Command. This record has been sustained for over twenty-three years, not by any one individual, but each contributed and of course it would only take one to ruin it. So people make the difference, their character, personality, experience and behavior make for success or failure.

We went to the people of the 170th and asked them to share their thoughts and opinions with the readers of *Combat Crew*. Their enthusiasm and willingness to contribute was characteristic of their entire operation.

A gentleman who is respected by his group, not only for excellent leadership but also, for his ability to communicate effectively, Colonel James E. Young, Commander of the 170th AREFG, discussed his feelings about their accident free record. "Never is there just one thing that causes mishaps, but rather a number of closely related parts. Safety

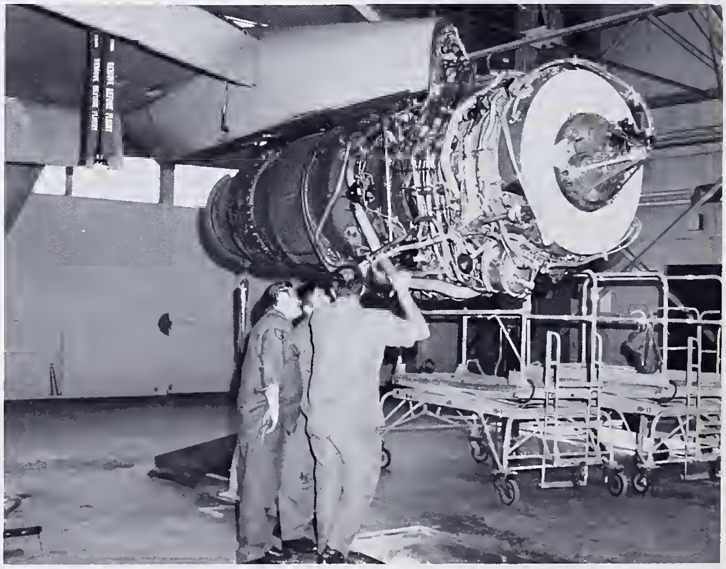
the Top

One of the 170th crews during mission planning. Pictured are (L to R) TSgt John Kantorek, Capt John Rosenthal, Capt Dick Belena and Lt Dave Savino.

During preflight, this 170th crew rechecks their takeoff data.

Photos by TSgt John Kantorek

Safety begins on the ground which leads to expert maintenance. Here SSgt Bob Loveless, TSgt Ray Lawrence, and MSgt Jim McDonald inspect a KC-135 engine.



is a function of the attitude of the people involved. Experience plays a major part and of course plain old luck is there too." Colonel Young tends to concentrate on the limitations and capabilities of his people combined with suitability on the job. His next comment was on the topic of safety. "I don't think that our safety program is any different from all the others around the Air Force — just more experienced group members. The average age is about thirty-five years old. You might think that because of the number of years they have been around and their experience level that they might tend toward complacency, but it is just the opposite! They are extremely professional people, highly skilled and they don't think that they have seen everything that can happen out there." He continued with, "Experience allows for knowing where to place priorities in an emergency — like always being mentally prepared. There is a balance of talent throughout the unit. The general rule is simply, safety comes first."

Colonel Young trusts his people, knows his people and knows what complaints will arise and how to handle them. What about morale at the 170th? The commander's opinion was that, "Morale is very high. There has been a change of mission which provides challenge and helps avoid dreaded stagnation. The majority of people here enjoy their jobs and are good at it. The guys really respond to challenge and I think that they have that great feeling of accomplishment, which always keeps morale up."

Since operations is the "key" that controls, directs and produces the means to the target, we visited there next and met the Director of Operations, Lt Colonel Neil Kennedy, who had this to say, "The 170th is proud of its flying safety record. The unit has flown C-46, C-119, C-121, C-7 and the KC-135 over 82,000 hours without an accident. Some of the prime factors contributing to such an accomplishment include having a select, relatively small unit with highly experienced, dedicated personnel in its operations, maintenance and support functions." He continued —

"In addition, we have a vigorous safety program not confined to the limits of the safety office. All of our people, from the commander to the newest recruit are thoroughly indoctrinated in a "safety first" concept. This has been our secret of success in safety."

What kind of people make up the 170th Air Refueling Group? Well, of the forty-eight pilots over twenty work for commerical airlines in civilian life. This means that they average about 70-75 hours in the air per month in civilian life alone, not counting hours spent with the Guard. This accounts for the high degree of professionalism and experience found at the 170th. These are ex-military pilots who left the regular air force and wished to remain involved with flying for the military.

Col James E. Young, commander of the 170th, at the controls of a KC-135.

Major Jack Clary, pilot for the 170th, has accumulated over 18,000 hours in the air. His answer to the question, what motivates his safe behavior? was, "If you are a professional pilot then safety counts above all else. It all comes down to doing a good job regardless of what phase of flying. My concern is not getting hurt and not hurting others." He added, "I think that the biggest contribution to our perfect record is the experience level of our people. We are fortunate to have this group."

Does a "perfect record" affect the conscious behavior? Captain Chip Morgan answered this question when he said, "It is similar to a long batting streak; you are more conscious because you think this trip will be one more, but I don't think it really affects us much, it is in the back of my mind and it would be nice to be able to replace the word "none" with "never."

The Safety Officer was an obvious next choice to ask about his part in the game. Captain Ed Corns had the opinion that, "Operating procedures can not cover each and every situation. Grey areas are open to interpretation by the air crew. Our crews are not over-supervised, but because of the high degree of experience, many decisions can be made right on the spot without doubt. If they need help they are smart enough to go to the expert, whether it be SAC Headquarters or Boeing. I would say that the elements of safe flying seen here at the 170th are common sense and a knowledge of procedures. For example, in an emergency the crew knows enough to fly the airplane first!" Captain Corns continued with, "When it comes to safety, the people here at the 170th are so experienced and good at their jobs that most times they know more than me. I maintain a safety program, both ground and flying, and make sure my job gets done through mishap prevention programs, crew meetings, dissemination of latest flying safety information and I keep an eye on

Continued on page 15

SAFETY FIRST

Lt Col Theodore Alexander
HQ SAC Ground Safety Division

Did you hear the one about the alert truck that tried to attack the airplane? It seems the crew, responding to the klaxon, forgot to turn off the ignition. After their aircraft engines were started and as the crew began to taxi, the pilot noticed their truck was backing around behind the aircraft. Interesting situation. What do we do now, crew?

A moving truck, no driver, alert exercise, ah yes, decisions, decisions. Situations like this one, although rare, do happen. And in that split second before we make our decision we may ask ourselves how the heck did I get into this mess — how indeed! Well, as Murphy said, if there's a way, someone will figure it out.

At SAC headquarters, we look at somewhere between 150 and 200 reports each month of ground mishaps alone and it is continually amazing to see the trouble some people will go to to hurt themselves or to damage government equipment. Month after month we read how we continually try to prove just how imperfect we are.

Did you hear the one about the young lady who lost three days of work after she accidentally stuck a pencil in her nose? Or the guy who broke his toe in the middle of the night? He stubbed it first, then as he hopped around on the other foot, he stubbed a toe on that foot and broke it. Funny? Not to him.

But because of these mishaps and many more just like them, only more serious, your safety staff launches a campaign each year to once again emphasize the hazards and problems associated with the upcoming season. Many of you have heard them all before and that's part of the frustration of being in safety. Education is often easy compared to motivation. How do I motivate you to do what you already know is proper, is common sense? How do I motivate you to slow down, use the checklist, wear seat belts, save your own life? I wish I knew, I could have saved 47 lives last year.

Last year, we had the lowest number of fatalities anyone can remember, but we still lost 47 lives. Nothing new to tell you about these fatalities, same old causes, same old story, same old song. If you read each one of the reports you'd say the same

thing I did, "It should have never happened."

Did you hear the one about the crewmember who cut off part of his finger on a paper cutter? Then there were the combat crewmembers, secure in the knowledge they could do the job better than anyone, responsive, resourceful — clumsy! One broke an ankle last year jumping from an airplane, another backed his truck into an airplane, one had his truck hit by a fire truck, and responded by hitting a private auto with his truck. Murphy's law applies to everyone, doesn't it?

I hope I made my point. It can and does happen to you, the other guy. No one has more respect for the combat crewmember than I do or for the many people who support our missile and aircrews on alert. It's a demanding task with extreme pressure and few tangible rewards. In months and years to come the pressure will increase. Pressure to get there faster, do it better, more efficiently, but without injury, loss of life or equipment. That brings us back to motivation. How do we motivate you to apply the knowledge and experience from lessons learned toward your task. Too often, that motivation gets clouded in the overwhelming circumstances surrounding the job.

A former wing commander of mine said, "Never in the history of this command has it been more important to extract the absolute maximum value from each available resource. To achieve this goal we must keep our activities accident free. Each individual involved with mission accomplishment is responsible for insuring that his or her work activities are conducted with complete safety at all times."

Safety is not a special subject. It is inherent in everything we do; in every act, in every decision. Safety is the professional approach each time, all the time. No magic formulas, no *safety first* slogans, just simply — the mission — safely.

OPS — HQ SAC DCS/OPS UP-DATE

MAJOR GENERAL JACK L. WATKINS

DIRECTORATE OF COMMAND CONTROL – BRIG GEN KENNETH L. PEEK, JR.

NEW AIRBORNE COMMAND POST (ABNCP). The E-4B arrived at Offutt AFB on 19 December for Initial Operational Test and Evaluation (IOT&E). The IOT&E is a key phase in the weapons system acquisition process; it provides the using command an opportunity to employ the new system in an operational environment and assess its suitability and effectiveness. In the case of the E-4B, a modified Boeing 747, the using agencies are SAC and the National Emergency Airborne Command Post (NEACP), an element of OJCS. After the 45-day period of IOT&E, the E-4B will be flown to Kirtland AFB, NM, for electromagnetic pulse (EMP) hardness testing. (DOCA)

COMMAND CONTROL — A DYNAMIC CAREER FIELD! The Headquarters SAC Command Post is the nerve center of the SAC command control system and controllers on duty act as executive agents for CINCSAC in matters pertaining to control of the SAC force. The SAC command control system is a network of command posts which act as links in a chain of command between CINCSAC and combat aircraft/missile crews. Individuals selected to man these highly visible positions in the Hq SAC Command Post require previous command control background. Controllers on duty are responsible for implementing National Command Authority/JCS/CINCSAC directives for command control of US strategic nuclear forces and day-to-day monitoring of the status of the SAC Alert Force. (DOCS)

DIRECTORATE OF TRAINING – COL HARRY L. BROWN

CELESTIAL GROUND MISSIONS. As a result of a Hq SAC/DO initiated program, each SAC flying wing will soon receive a newly developed Celestial Training Device (CTD). The CTD will replace the currently available tape/slide celestial navigation legs. The major improvement offered by the CTD is its ability to allow each navigator to "fly" navigation legs of their choice. Missions are accomplished using real time parameters and each navigator may select any of over 200 celestial bodies which are stored in the CTD memory. Navigators will establish their own "shooting" schedule and alter heading at their convenience, rather than following a script. The entire mission is accomplished with simple input commands to a processing unit via a keyboard. A TV monitor simulates aircraft instruments and provides the navigator instructions necessary to accomplish the mission. Upon mission termination, a hard copy analysis is provided to aid in mission evaluation. The CTD is a long overdue improvement to ground celestial training and should be enthusiastically received by the navigators of the command. (DOTN)

SACR 50-4 CONFERENCE. In Nov 78, representatives from Headquarters SAC, NAFs, 1 CEVG, Hq AFRES, and the National Guard Bureau met at Barksdale AFB to update SACR 50-4. Emphasis was placed upon aligning our training program to the SIOP as much as possible. Crews were authorized to accomplish low level training missions under daylight VFR conditions without mapping radar, clearance plane settings were lowered, B-52 crews were authorized to fly night mountainous TA, and low level enroute airspeeds were standardized for all military training routes. Visual bombing procedures were also incorporated into the regulation. (DOTN)

NEW B-52 TRAINING REQUIREMENTS. Effective 1 January 1979, new bombing and navigational training requirements were implemented into the B-52 continuation training program to enhance the overall capabilities of the B-52 bomber force. "Pilot Visual Multiple Release Bomb Run" and a "Low Altitude Radar Out Exercise" were incorporated into the quarterly training requirements for mission-ready crews. Also, STR sites equipped with jammers are, on a no-notice and random basis, providing continuous jamming during some bomb runs. These requirements have been instituted in an attempt to train aircrews for unplanned occurrences that could happen in a combat environment. The training requirements stress that bombing should be a total crew effort and not be restricted to the use of certain techniques and equipment. Thus far, aircrews have been enthusiastic about the challenges these new training requirements are presenting in solving the navigation and bombing problem. (DOTT)

DIRECTORATE OF OPERATIONS – COL GEORGE P. TYNAN

SAC ALERT FORCE PANEL. On 1 December 1978, the Strategic Air Command established, for the first time, a consolidated body within the headquarters to review issues, develop coordinated positions and provide guidance on matters which deal with operations and personnel of bomber, tanker and missile alert forces. Chaired by the SAC Assistant DCS, Operations, the Alert Force Panel is composed of over 20 major SAC agencies. Like panels have also been established at NAF and 3AD. The object of these committees is not to circumvent the Wing Commander's management of their resources, but to provide an avenue for problems that directly affect the alert forces to surface where they may be worked at the headquarters level. To date, the SAC panel has reviewed numerous problems and initiatives such as the A La Carte dining system, dress requirements, fast ride vehicles, CCRR, crew changeover, alert substitution, training requirements and 'facilities' in general. Bomb wings and missile wings will continue to convene their local Alert Force Support Committees with the primary goal being the enhancement of combat crew alert force duty. Actions which require Hq SAC assistance will be forwarded to the Hq SAC Director of Operations (DOO). It is SAC's ultimate goal to provide continued improvement in the quality of life while assigned to combat crew duty. The continued effectiveness of these panels will be equal to the inputs submitted, by the crew members, through the wing and NAF/panels to Hq SAC. **Use this vehicle** — it's yours! (DOOO)

B-52 TRAINING FLIGHTS TO EUROPE. Just after midnight on 1 Nov 78, three Seymour Johnson B-52Gs departed home station on a unique training mission, one that would be a "first" for the B-52. Approximately eight hours later the bombers were conducting a high altitude conventional bombing attack against a Strategic Training Range in central Germany. After refueling off the West coast of England, the bombers returned non-stop to Seymour Johnson. A similar mission was flown on 6 Dec by Dyess crews and aircraft, round robin from Griffiss. These B-52 contingency training missions, conducted in three-ship cells with a mission duration of 18 to 20 hours, were flown under the title of BUSY BREWER. The missions afforded training in every aspect of the B-52 conventional role and provided aircrews with the experience that can only be gained by flying in the European theater. Current plans call for participation in some type of contingency operation in Europe each month in order to enhance SAC's present contingency training program and further emphasize the capability of the B-52 to rapidly support a conventional conflict in Europe. (DOOC)

BULLET BLITZ. Two live launches are planned this month as part of Bullet Blitz, the SRAM Operational Test and Evaluation program. An FB-111 crew from Plattsburgh will launch a missile in the inertial mode on 28 March, and a Fairchild B-52G crew will launch one in the terrain clearance mode on 29 March. Both tests will be performed on the Tonopah Test Range, NV. Accuracy and reliability data collected during test missions are used in development of SIOP planning factors. (DOOV)

DIRECTORATE OF STRATEGIC RECONNAISSANCE – COL HARLON A. HAIN

COMMUNICATION IN THE NEAR FUTURE. Strategic Air Command reconnaissance crews will be the first to make use of satellites for operational command/control communications. Although AFSATCOM will be in a test phase for some time yet before final operational concepts are developed, reconnaissance crews will be using the satellite comm system on a limited basis to conduct routine operations. While the official operational capability date when all aircraft are equipped is in the distant future, those crews that will use the system are looking forward to this greatly enhanced method of long range communications to complement their noisy HF system. (DORC)

DIRECTORATE OF MISSILES – COL JOE L. CHURCH

PALACE MISSILE BRIEFINGS. AFMPC recently presented a briefing on Missile Operations Officer Resource Management to the SAC Missile Wing DO conferees. The briefing was so well received that plans are now being made to have it produced on videotape and distributed to all nine missile wings. The personal comments of Maj Gen Watkins will introduce the briefing. (DOMM)

OPS UP DATE

DIRECTORATE OF WEATHER – COL ALFRED C. MOLLA, JR.

THUNDERSTORM AVOIDANCE — STILL A PILOT RESPONSIBILITY

Spring is fast approaching and soon those "thunderbumpers will be ablooming and abooming!" Now is a good time to start thinking about the old springtime and summertime nemesis and start planning for thunderstorm avoidance.

Air Traffic Control's (ATC) new narrow band radar and its Weather and Fixed Map Unit (WFMU) were described in the "Big Instrument" article published in the June, 1978 issue of *Combat Crew*. Our friendly weather troops would like to point out that ATC's capability to identify and display thunderstorm activity is limited. Though the ATC weather display is helpful to the controller, their radar was designed primarily to do the ATC job: tracking and separation of aircraft. Pilots should use information derived from the WFMU with caution and only in conjunction with other weather information.

The WFMU electronically reduces weather information to two threshold levels for display. A recent Air Weather Service study concluded that because the Federal Aviation Administration (FAA) radar is tailored for ATC use, the WFMU cannot reliably specify the intensity of thunderstorms, or whether they are building or decaying. In some cases the radar may not even display the thunderstorm at all.

FAA radars do not make good storm detection radars for several reasons. In comparison with weather radars, these FAA radars have a larger vertical beam width — even when used for storm detection purposes. Since the echoes represent an average value of storm intensity over the entire vertical extent of the beam, a large vertical beam width can result in significant errors in echo intensity. As you can see from the diagram, at longer distances from the radar much of the beam may be looking at clear air and the resulting display intensities may be much less than the actual thunderstorm intensity. Furthermore, the FAA radars have a fixed beam elevation angle which hinders these radars from measuring thunderstorm tops. FAA radars use a system for adjusting echo intensity to account for distance differences as do weather radars. However, the FAA adjustment factors are for efficient detection of aircraft, not weather phenomena. The net effect is that when detecting weather, the possible errors in measurement of strength of the echo can be very large.

Weather radar is designed specifically for weather information. Some major design differences are a much narrower vertical beamwidth and a beam elevation angle that can be rotated vertically to measure thunderstorm tops more reliably. Also, weather radars use smaller wavelengths (5-10 cm) which are optimum for precipitation/storm detection. FAA radars, which are designed for efficient aircraft detection, normally use a longer wavelength (23 cm) which usually "tunes" out all but the largest thunderstorms. These differences give weather radar a much greater sensitivity and capability for measuring intensities of thunderstorms and whether they are building or decaying.

While we are on the subject, let's briefly mention the airborne weather radar. This X-band weather radar can be a big help, but it also has its limitations. According to the National Traffic Safety Board Aircraft Accident Report on the crash of the Southern Airways DC-9 in New Hope, Georgia:

> Scientific studies show that the X-band frequency radar is comparatively susceptible to attenuation by water vapor and precipitation. This may be particularly true when precipitation covers the antenna radome. If a pilot fails to consider this limitation, he may misinterpret the display in the process, which is a significant reason why airborne radar should not be used as a storm penetration aid. For maximum effectiveness, interpretation of X-band radar displays should be accomplished when the aircraft is in areas free of water vapor and precipitation.

Finally, a few comments on a recent program initiated by the FAA and the National Weather Service (NWS). The controller's primary duty is tracking and separating aircraft — a demanding enough job of its own. Under the new program, selected Air Route Traffic Control Centers (ARTCC) now have NWS meteorologists assigned to help the controller keep a better handle on the weather. These ATC weather folks have access to weather radars. The selected centers which have meteorologists on duty from approximately 0600-2200 local time are listed in the DOD FLIP "General Planning" and are also listed below:

Atlanta
Boston
Chicago
Cleveland

Ft Worth
Houston
Indianapolis
Jacksonville

Kansas City
Memphis
Miami
New York
Washington

All twenty ARTCCs in the contiguous United States should have weather personnel assigned by 1 Oct 1979.

Keeping in mind this information on radars and ATC duties, what can aircrews do to ensure they have a safe flight when thunderstorms are expected or encountered in route?

First, obtain a thorough briefing of the most likely location of thunderstorms along your route during your predeparture weather briefing.

Second, do not fly into areas or into clouds in areas of known, or suspected, thunderstorm activity without an onboard working radar.

Third, be knowledgeable in weather radar scope interpretation. (Review the Air Weather Service seminar "Thunderstorm Avoidance Using Airborne Radar.")

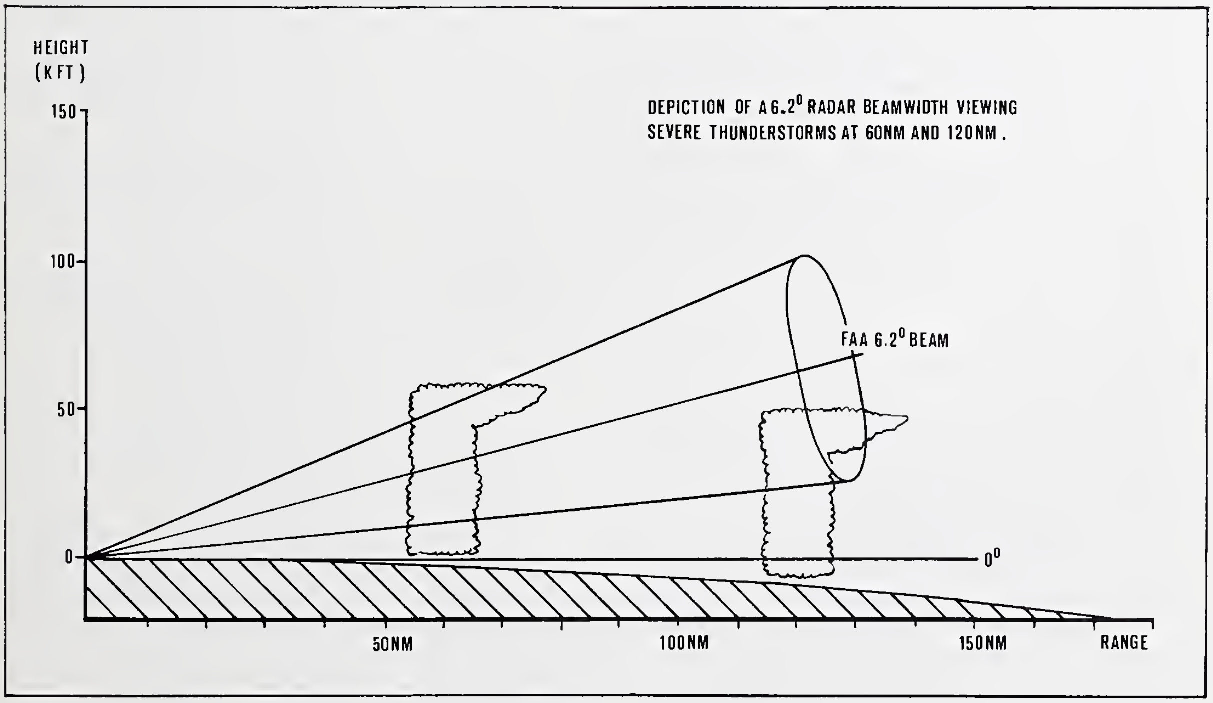
Fourth, make maximum use of PMSV. Contact weather detachments having both a weather radar and a forecaster on duty or one of the ARTCCs with a meteorologist on duty.

Fifth, be cautious about using ATC or airborne radar alone.

Aircrew inputs are extremely helpful too. PIREPS are a primary source of weather information for the ARTCC weather folks. When you're talking to the center, pass on what you can see and if you're painting a big one on the radar, pass that on too. They'll appreciate it and other aircrews in the area may really benefit from your help.

In conclusion, Mother Nature makes thunderstorms, the weather folks predict them, FAA radars are limited in detecting them and pilots must avoid them. We would like to reemphasize Capt Walters' closing words in the "Big Instrument" article. Thunderstorm avoidance is still a pilot's responsibility.

(Capt Cleveland G. Holladay, DOWA)


HEIGHT (KFT)
150
100
50
0
DEPICTION OF A 6.2° RADAR BEAMWIDTH VIEWING SEVERE THUNDERSTORMS AT 60NM AND 120NM.
FAA 6.2° BEAM
0°
50NM
100NM
150NM
RANGE

"ROGER TRAFFIC"

Captain David Pine
4235 STS
Carswell AFB

"Minor 52, you have traffic at your one o'clock position, nine miles, heading 190 degrees." The two helmets in 52's cockpit swiveled in unison to scan the horizon. Clear and a million, blue sky, not a cloud or aircraft in sight.

"Minor 52, this is Denver Center, did you copy traffic?"

A brief exchange on interphone between the white helmets turned up nothing.

"Denver Center, Minor 52, roger traffic."

Seconds later, two hikers on the mountain trail below looked skyward as they heard the explosion, time enough to see the flaming wreckage falling to earth.

This particluar scenario was fiction, but the events described right up to the point of collision were no doubt familiar to all aviators. As airways and airports become more crowded, the communication we use to insure safe separation of aircraft must be precise and professional. A case in point is the situation we just described. Did you notice anything which might have helped lead to the midair?

In our example, the pilot's radio reply was: "Roger traffic." Did he mean "Yes, I see the traffic" or "Yes, I received your transmission"? The term "roger" is defined in Air Traffic Publication 7110.65A as an acknowledgement that you have received all of the last transmission. How many times have you heard it used to indicate a person will comply with a controller's directions or as an affirmative reply?

O.K., so what? Knowing what "roger" means still wouldn't have prevented the midair we described — or would it? Let's face it; no matter how sophisticated our equipment becomes, the people who are using it are still human. Being human, when we think someone has taken control of a situation, we tend to turn our attention to other matters at hand. In this case, the Center controller may have felt the pilot had the other aircraft in sight, the danger of a midair collision is no longer likely. Had the pilot clearly stated that he was looking for the reported traffic and did not yet have him in sight, it would certainly have commanded the controller's full attention.

Professional radio communications are a method of making your actions and intentions known and understood by the other guy. Recent aircraft mishaps and incidents show radio terminology is still an appropriate theme for review. Without further ado, here is a short list of terms and definitions taken *verbatim* from the PILOT/CONTROLLER GLOSSARY used by Air Traffic Control.

AFFIRMATIVE	—"Yes"
NEGATIVE	—"No" or "Permission not granted" or "That is not correct."
NEGATIVE CONTACT	—Used by pilots to inform ATC that: 1. Previously issued traffic is not in sight. 2. They were unable to contact ATC on a particular frequency.
OUT	—The conversation is ended and no response is expected.
OVER	—My transmission is ended; I expect a response.
ROGER	—I have received all of your last transmission. It should not be used to answer a question requiring a yes or no answer (Affirmative/Negative).
TRAFFIC IN SIGHT	—Used by pilots to inform a controller that previously issued traffic is in sight.
VERIFY	—Request confirmation of information; e.g.,"verify assigned altitude."
WILCO	—I have received your message, understand it, and will comply with it.
WORDS TWICE	—1. As a request: "Communication is difficult. Please say every phrase twice. 2. As information: "Since communications are difficult, every phrase in this message will be spoken twice."

Look familiar? Hopefully they do, since you should hear them often enough while using and monitoring the ATC frequencies. The next time you head up into the "Wild blue yonder," give these terms a chance to help make your flight easy and safe.

Out.

Climb to the Top

Prior to flight, the 170th crews review mission, weather and safety aspects at base operations.

Continued from page 7

equipment. I attribute our safety success to the experience of the people. The procedures are the same as anywhere else, but the mental approach may be different. It is sort of like starting a lawnmower, some people would think first about their feet and some would not."

We continued to seek out the individuals who are a part of the 170th and found a boom operator, SMSgt George Fusco. His comment was, "I've been working around airplanes for the past 25 years. I have worked in both aircraft maintenance and as a flying crewmember for the past 15 years. Airplanes have always been in my blood and I quickly developed the attitude that as long as you respect aviation, develop safe practices and follow safe procedures you can remove any fears you might have for flying."

The obligation of a combat crewmember is above and beyond that expected of any other group of Americans. Crew duty is both challenging and boring, fascinating and frightening, and hectic as well as slow-paced. KC-135 Crew Chief, Master Sergeant Jim Moskos added, "People's lives depend upon the quality of work I do. What I do is right and I do it to the best of my ability. If I need a question answered I won't hestitate to ask someone and make sure I am getting the best information available. I not only want to make sure it is done, but that it is done right."

Webster's New Collegiate Dictionary defines safety as: *The condition of being safe from undergoing or causing hurt, injury, or loss.* In response to this definition, Senior Master Sergeant Frank Marasko, Section Supervisor of Crew Chiefs, stated, "My initial training around machines emphasized safety. My father and grandfather had a great deal of machinery around the house. From the time I can remember safety around machinery was stressed. In my job here at McGuire we have a lot of safety literature, accident prevention letters, accident reports, etc. It keeps us very safety conscious."

The 170th realizes that evey shop and team operates under conditions which are unique, but each man decides within himself to be or not to be safe. It is a matter of habit and the result of extreme professionalism beginning at the staff level where the commander creates the atmosphere of safe behavior. Good crew coordination leads to cross checks that are an essential element of safe flying.

Senior Master Sergeant William Boyle, Chief of Quality Control, had this to say, "I like to be on safe footing. I've had 2000 hours in the air myself as a crewmember, and I want to get those people back down safely. I put myself in their shoes. When I say an aircraft is O.K. I would get into it and fly without question."

Operations and maintenance works hand in hand to ensure that a good safe airplane is prepared to accomplish the mission. When there is little friction among workers and support agencies are efficient and competent, many possible mountains become molehills. The respect found between the people of the 170th forms the basis for smooth working relationships.

Safety begins on the ground, which naturally leads us to the professional and expert maintenance crew. These are the guys who make sure that the aircraft does not break and does not cause emergencies. The proficiency was found to be extremely high in the 170th maintenance area. This results in specialization combined with expert skilled workers. The 1958 models of the KC-135 are in top shape and according to Major Clary, "The 170th has the best maintenance crew in the country."

The 170th has hard working maintenance personnel willing to give their job the attention to detail without letting up. Major Michael Fevola, Assistant Chief of Maintenance, commented. "I always think about doing tasks safely because of the inherent dangers in the job. I know the job is dangerous — if I didn't want to do it, I would go do something safer. Experience is a key word. Safety has a lot to do with experience."

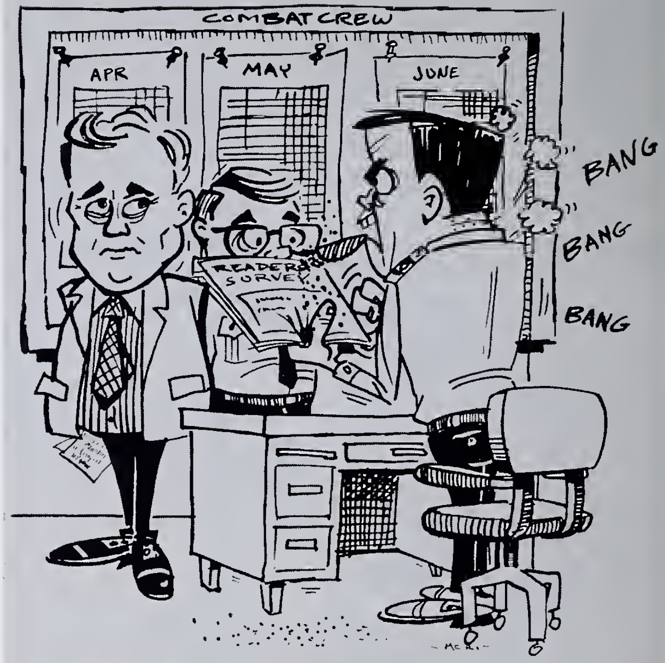
A former SAC Director of Safety once pointed out that from the standpoint of safety, our responsibility is to conserve valuable material resources and our challenge is to continue to operate new as well as existing weapon systems in as safe a manner as possible. The Boeing KC-135 Stratotanker, first delivered to SAC in 1957, gives the SAC high speed jet-to-jet aerial refueling capability. With weight capacity up to 299,000 pounds the maintenance of this aircraft is more important to its safe flights.

Chief Master Sergeant Earle Johnson, Chief of Field Maintenance Branch, says, "I am geared for safety. I read articles about people losing their fingers because they wear rings on the job. I never wear a ring. Unsafe acts are unacceptable. I learned safety around airplanes during my Navy training back in World War II."

Tech Sergeant Joseph Boysel, Chief of Engine Shop, echoes this sentiment when he states, "Doing the job and doing it safely are one and the same thing. Safety is just as important an ingredient as using the right tool or following the tech orders."

As a result of our visit to McGuire I guess you could say having the right crew means everything. The key is for every crewmember, supervisor and commander to understand and be constantly aware of human limitations and capabilities and work within those perimeters.

How does one climb to the top and stay there? The 170th proves it can be done by having the potential to continue their progress, and like a winning football team, keeping it all together.



If I had wanted an honest opinion from our readers, I'd have asked for it!!

COMBAT CREW WANTS YOU . . .

to please take the time to fill out a grade sheet on the quality of the magazine. This is your safety magazine and now is your chance to be the boss and let us know what you like and don't like about the publication.

All you have to do is cut out one of the survey sheets on the following page, fill it out and mail it in. We are soliciting constructive comments to help us produce the kind of magazine you the combat crew members would like to read.

This readership survey is conducted as required by AFR 5-1, para 12-23. In accordance with AFR 12-35, para 30, Air Force privacy Act Program, the following information about this survey is provided: (a) Authority: 5 USC 301, Departmental regulations, 10 USC 8012, Secretary of the Air Force: Powers and duties; Delegation by: (b) Principal use: To collect opinions about Combat Crew magazine; (c) Routine uses: Data to be used by decision makers in evaluating effectiveness of publication and for submission with DD Form 1909; (d) Participation is voluntary; (e) Effects on respondents: No adverse action will result to individuals as a result of this survey.

CUT ALONG SOLID LINE

Combat Crew Reader Response Form

Please answer the following questions and forward to ***Combat Crew*** Magazine

1. How many issues of ***Combat Crew*** have you seen in the past year? Circle one:

1 2 3 4 5 6 7 8 9 10 11 12

2. How soon after publication month do you usually see an issue of ***Combat Crew*** ?

Check one: ☐ Same month ☐ One month later ☐ Two months later ☐ Three or more

3. How do you usually receive a copy? Check one: ☐ Through normal distribution.

☐ From someone else. ☐ See it in the work center. ☐ Rarely see a copy.

4. Please indicate your response to the following quality of articles and features.	CONTENT			FREQUENCY		
	EXC	GOOD	POOR	EXC	GOOD	POOR
EDITORIAL						
ARTICLES FROM UNITS						
HQ STAFF ARTICLES						
BIG INSTRUMENT						
R & D CORNER						
ACE TOPICS						
OPS HAZARDS						
MISSILE MISHAPS						
BOMBING, MISSILE AND MUNITION						
COMPETITIONS ARTICLES						
PROFESSIONAL PERFORMERS						
SAC SAFETY SCREEN						
HALL OF FAME						

5. Would you submit an article? ☐ Yes ☐ No

6. Have you gained any additional safety awareness by reading ***Combat Crew*** ? ☐ YES ☐ NO. How well do you think ***Combat Crew*** gets the safety message to the SAC combat crew member? ☐ EXCELLENT ☐ GOOD ☐ FAIR ☐ POOR

7. Graphic Presentation (art work, photos, etc.) ☐ GOOD ☐ FAIR ☐ POOR ☐ CAN BE IMPROVED

If so, how?

8. Please indicate ways the staff of ***Combat Crew*** can better serve our readership, the SAC combat crewmember.

My Air Force Job Is

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If so, how?

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My Air Force Job Is

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BIG INSTRUMENT

60 TO 1 RULE

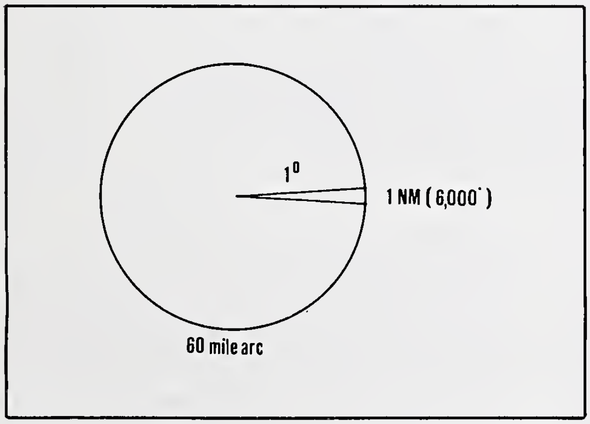
Captain Tome H. Walters, Jr.
1st CEG Barksdale AFB

One of the most useful concepts in instrument flying is the "60 to 1 Rule." Simply stated, the 60 to 1 rule says (for any airplane) a 1° pitch change from level flight results in a climb or descent of 100 feet per nautical mile (1° = 100 ft/NM). From that starting point, any pilot can quickly and easily compute a climb/descent gradient and corresponding pitch change. Skeptical? That's understandable. But the collective experience of pilots who use the 60 to 1 method is that it works — on paper and in the air. It should be one of your basic instrument flying skills.

What can the 60 to 1 rule do for you? It can take the guesswork out of pitch control and, properly employed, can reduce the pilot workload. It yields an accurate pitch setting that requires fewer adjustments. It simplifies three of the four steps in attitude instrument flying: establishing an attitude, crosschecking performance instruments, and adjusting the attitude.

Theory

Fig 1



Since 1 NM equals approximately 6,000′, then 1° = 6,000′ at 60 NM. At 1 NM, 1° = 100′, or 1° = 100 ft/NM.

If the math doesn't interest you, no problem. Accept the bottom line (1° = 100 ft/NM) and go from there.

Fig 2

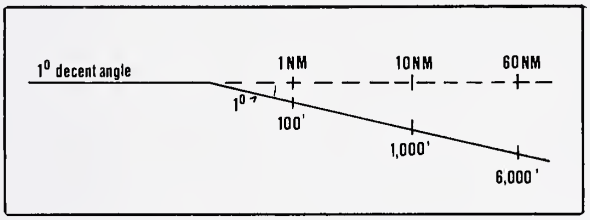


Fig 2 illustrates that a 1° pitch change from level flight will result in a descent gradient of 100 ft/NM — REGARDLESS OF AIRSPEED. This is a key point. It doesn't matter if you're flying a KC-135 at .7 mach, an F-15 at 1.5 mach, or a Battlestar at the speed of heat. All three machines will lose 100 ft/NM with a 1° pitch change. Vertical velocity indicators will certainly be different. But the descent gradient, 100 ft/NM, will be the same.

To apply the 60 to 1 rule, you need to know the relationship between pitch change and vertical velocity. From early pilot training days, each of us learned to correlate pitch change and vertical velocity with the mach indicator. We were making use of the mach indicator as the pilot's NM/min meter and the formula VV = degrees pitch change X NM/min X 100. A 1° pitch change at .7 mach would equal a 700 ft/min change in VVI.

How It Works

Q. You want to lose 15,000′ in 30 miles with .6 indicated mach.

a. What is your descent gradient?
b. What pitch change will you make?
c. What will be your **initial** vertical velocity?

Ans:

a. Your descent gradient = $\frac{\text{Altitude to lose}}{\text{miles}}$

In this case, $\frac{15{,}000'}{30\text{ NM}} = \underline{500\text{ ft/NM}}$

b. Since 1° pitch change = 100 ft/NM, the required pitch change would be $\underline{5°}$.

c. Your initial vertical velocity = pitch change x NM/min x 100, or 5° x 6 NM/min x 100 = $\underline{300\text{fpm.}}$

Why do we say **initial** vertical velocity? Because vertical velocity changes as the True Air Speed (TAS) changes. For a constant Indicated Airspeed (IAS) descent, the TAS and indicated mach will decrease as you descend. The vertical velocity then will change, even though you're continuing to lose 500 ft/NM. Once you're aware of that, you will realize the problem of fixating on the VVI during large altitude changes. The "correct" vertical velocity changes when airspeed (in terms of indicated mach) changes.

The VVI is useful, especially to crosscheck proper pitch change. If you intend to maintain a 5° descent angle with .6 mach and the VVI initially stabilizes at 2400 fpm, you need to adjust one more degree.

VVI can also be used in one technique to monitor the descent angle. After losing 5,000' your VVI is now 2500fpm and indicated mach is .5. Are you maintaining the planned 5° descent gradient? Descent Angle =

$$\frac{\text{VVI}}{\text{NM/min} \times 100} = \frac{2500}{5 \times 100} = 5\,°.$$ Yes, you are.

Those are easy calculations to make. If you initially doubt the number you work up in your head, then use a knee board, a calculator, or an MB-4 computer (see 51-37, Chap. 3). You'll quickly gain confidence.

The key to applying the 60 to 1 rule to climb or descent problems is to think in terms of (1) feet/NM, and (2) pitch change. This establishes an attitude (Step 1). Remember to trim (Step 2), particularly if your indicated airspeed builds in the descent. Crosscheck performance instruments (Step 3). This is when VVI comes into play. Finally, adjust the attitude, if required (Step 4).

There are any number of methods to monitor your progress during a descent. The descent gradient approach may be the easiest of all. You know how many feet/NM you need to lose. Crosscheck the altimeter after 1 mile, or 5 miles, or 10 miles, or whatever number is easiest for you. If the gradient is not steep enough, adjust as required.

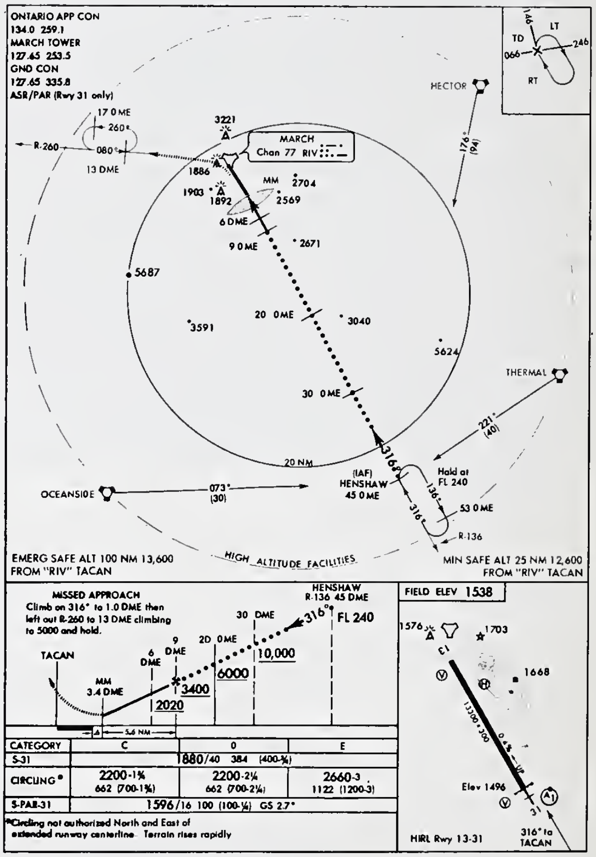
Your Turn

1. During departure, you are level at 7,000' with .5 indicated mach. ATC clears you to climb to 16,000' and asks you to be level in 30 miles for crossing traffic.
   a. What climb gradient is required?
   b. What will your VVI indicate, initially?
   c. Can you comply?

2. You are cleared to descend from FL310 to 10,000'. You're at 100 DME and you plan to be level at 30 DME. indicated mach is .75. Compute your
   a. descent gradient.
   b. pitch change.
   c. VVI.

2a. At 60 DME your altitude reads 22,000'.
   a. Will you make 10,000' at 30 DME if you hold your original descent angle?
   b. What pitch change would you make?
   c. The mach indicator now reads .6. What change in vertical velocity do you need?

Fig 3



3. Look at the H1 TACAN Rwy 31 approach for March AFB. (Fig 3).
   a. What descent gradient would be required to go from FL 240 to 10,000'? 6,000'? 3400'?
   b. What pitch change would **you** make to fly the penetration?
   c. At .55 mach, what would your initial VVI be?

Answers

1. a.

$$\frac{9{,}000 \text{ ft}}{30 \text{ miles}} = 300 \text{ ft/mile}$$

b. 300 ft/mile x 5 NM/min = 1500 ft/min

c. Depends — on your aircraft performance. (Weight, temperature, etc.). Obviously, there is not a "right answer." But if you can compute the required performance, then you can probably determine if you can comply.

2. a.

$$\frac{21{,}000 \text{ ft}}{70 \text{ miles}} = 300 \text{ ft/mile}$$

b. 3°

c. 3° x 7.5 NM/min = 2250 ft/min

2a.

a.

$$\frac{12{,}000 \text{ ft}}{30 \text{ miles}} = 400 \text{ ft/mile required.}$$

No, you won't reach 10,000′ (no wind) holding the 3° angle.

b. 1° nose down.

c. 600 ft/min increase in the descent rate.

3a.

$$\frac{24{,}000 - 10{,}000}{45 - 30} = \frac{14{,}000}{15} = 933 \text{ ft/mile}$$

$$\frac{24{,}000 - 6{,}000}{45-20} = \frac{18{,}000}{25} = 720 \text{ ft/mile}$$

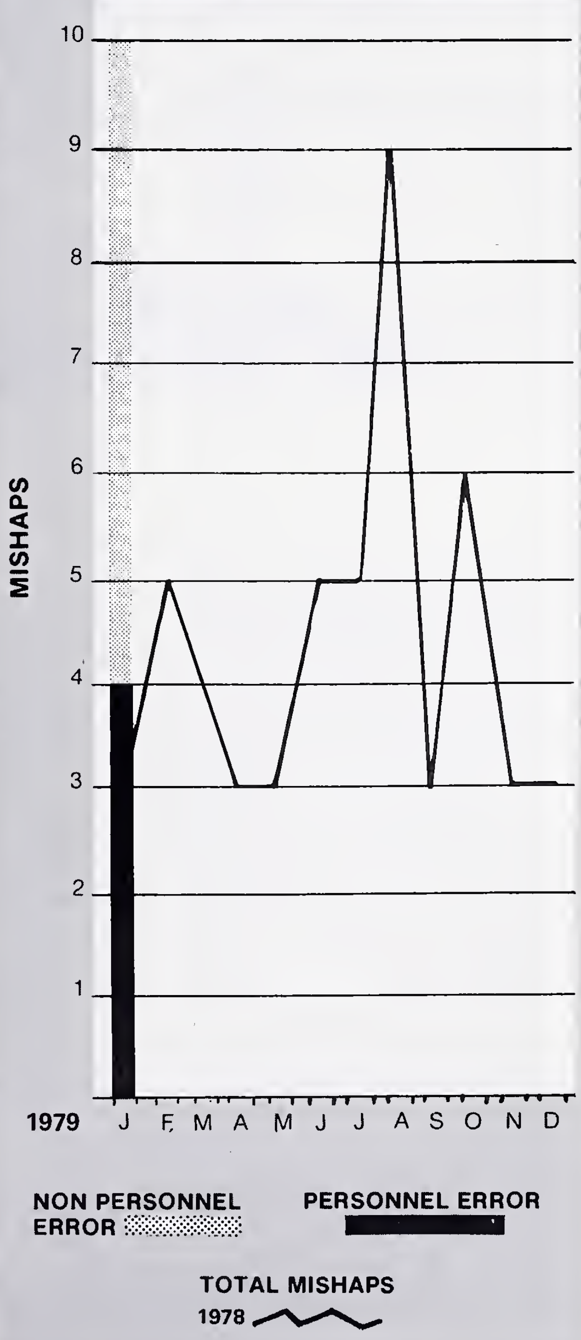
$$\frac{24{,}000 - 3{,}400}{45-9} = \frac{20{,}600}{36} = 572 \text{ ft/mile}$$

b. We suggest a 600 ft/mile gradient with a 6° pitch change (no wind). Since the first two altitude restrictions are "at or above", they don't present a problem. Holding 600 ft/mile would place you t 3,400′ two miles prior to the final approach fix. You might elect to use a 700 ft/mile gradient (7° pitch change) in order to level at 3,400′ earlier, decelerate, and configure.

c. 6° x 5.5 NM/min = 3300 ft/min. You might select 3500 ft/min for a target VVI. Always round off. Don't get bogged down with the last number. Frankly, it doesn't matter. If you're getting the hang of the system, you've figured out that the first number of the gradient is what's important. If you round off to the more conservative number, the system will work as advertised.

Missile Mishap Report

DOD CLASS A, B and C



OPS HAZARDS

CLEARED FOR TAKEOFF? Two alert force vehicles crossed the departure end of the active runway while responding to a klaxon-out exercise. A minute later another alert vehicle crossed at the same point. None had received clearance from the tower to cross the runway. What made this situation worse is that a KC-135 was on takeoff roll at the same time. Fortunately no mishap occurred but the potential was there. The tower wasn't notified in time by the command post to give the responding alert crews a green light for crossing. The alert crews were under written direction NOT to cross the runway without tower clearance.

At another base, an aircraft was on short final when an Air Force bus drove onto the runway near the mid field point. The bus was not in contact with the tower and didn't have clearance. The landing aircraft was over the overrun when the controller sent it around. The go-around was accomplished without incident and the pilot later said he didn't see the bus until beginning the missed approach.

Why was the bus on the runway? The driver had been dispatched to pick up a crew from a transient aircraft parked on the other side of the runway. The driver had crossed the runway escorted by transient maintenance with tower clearance. However, the driver went to the wrong parking spot and in trying to find the right plane drove onto the active runway thinking it was a taxiway. An operations vehicle finally caught up to the bus and escorted it off the runway.

At a northern base, a snow removal vehicle entered the active runway and caused an approaching aircraft to make an unplanned go-around. In this instance the driver of the vehicle had communications with his supervisor through a hand-held radio. The driver mistook instructions to work on taxiways "until we can get back on the runway" as clearance to "get back on the runway."

The problem of unauthorized vehicle entry onto the active runway is one needing attention. Recently a study was made at HQ SAC concerning ways to prevent these problems. Look for changes to come in the form of a SAC supplement to AFR 127-3 emphasizing reporting and procedures for handling unauthorized vehicle entries to runways.

ACE TOPICS

RUNNING OUT OF GAS — Have you ever thought about what you would tell the Safety Investigation Board if you ran out of gas? Well, there really isn't any reasonable excuse since pilots aren't supposed to do such a thing. Regulations address fuel requirements to include diversion capabilities and required reserves. However, publishing regulations on the subject won't prevent it from happening unless pilots use that guidance. A couple of recent incidents make me wonder if some pilots understand this. In the first case several T-37s launched out of base A for base B. They took off five minutes apart with the mission planned to the far edge of the aircraft's range. As they reached the destination, the first aircraft shot a VOR approach only to find that he did not break out. When he requested a GCA, he discovered it was out of service. The designated alternate was a civilian field on the other side of town (8 miles away). The minimums at the alternate were even higher than at the destination. Well, all the aircraft finally had to divert to the nearest suitable airfield. They landed with about 100 pounds. That's close!

The second case involved a T-38 returning to home base. The SOF directed approach control to divert the aircraft due to rapidly deteriorating weather. However, these directions got dropped somewhere in the communication system, and the aircrew shot several approaches to minimums before they decided that the weather was too bad to land. By then they did not have sufficient gas to reach their designated alternate and were forced to land at a civilian airfield having less than 8,000 feet of runway. They, like the T-37 aircrews, landed with not much more than fumes in the tanks.

The lessons to be learned are obvious. In the first instance, this time of year brings low ceilings, rain, drizzle, and fog. During winter these conditions can easily cover a wide area. Thus, an alternate 8 miles from the destination will probably go down at the same time as the destination. Hence, a long leg into such a field isn't too smart. In the second case, the crew's failure to adequately monitor fuel status could have had disastrous consequences. So when planning a winter flight, remember the different weather patterns and watch your gas. This will prevent you from having to answer the embarrassing question, "Why did you run out of gas?" — Major Myer

GRAVITY FEED — If you fly an entire T-37 mission with the fuel selector switch in the gravity feed (emergency) position, you will get a fuel low level light with how much total fuel on board?

a. 380 lbs

b. 620 lbs

c. 380 + 20 lbs

d. None of the above

If you picked answer c you are in the majority. If you picked answer b you are correct.

The Dash One tells us that in gravity feed the wing tanks will, assuming no malfunctions, feed the fuselage tank. It also says that the low level light will illuminate when the fuel in the fuselage tank reaches the low level float switch at 380 + 20 lbs. If all this is true, how can the fuselage tank fuel level get to 380 + 20 unless fuel is trapped in the wings? Easy.

Two facts make this possible: 1. A liquid seeks its own level. The bottom of the wing tanks is not higher than the top of the fuselage tank. Get the picture? Going back to our opening question, at 620 lbs total fuel you have about 375 lbs in the fuselage tank and about 122 lbs in each wing. The top of the fuel in each tank is nice and level and, as fuel is burned from the fuselage tank, the fuel in the wing tanks continues to seek the lower level of the fuselage tank until the wing tanks are empty. This occurs at about 226 lbs total fuel.

What does all this have to do with the big picture? Well, if you are in gravity feed and get a low level light with more than 380 + 20 you are still going to have to assume trapped fuel — initially. Just be aware that things could be ops normal. Subsequent fuel checks will confirm or deny trapped fuel as a possibility. — Capt Kirkwood

r&d corner

HQ/SAC — DIRECTORATE OF AERONAUTICAL REQUIREMENTS

Lt Col Gregg Crosby
HQ SAC/XPHN

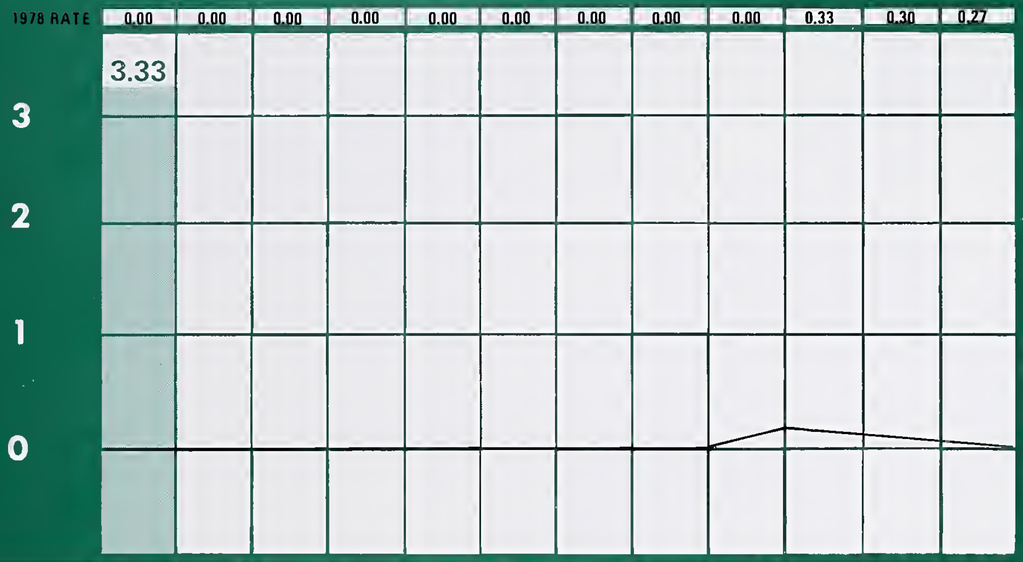
The Air Force Avionics Laboratory, a part of Air Force Systems Command, has begun flight testing the most revolutionary advancement in radar technology since World War II. This offensive radar was prototyped by Westinghouse Corporation and designed specifically with the strategic mission in mind. The radar is a phased-array multimode system called the Electronically Agile Radar (EAR) and, as depicted, is currently installed on board a B-52G aircraft. The system is now beginning a rigorous 50 flight analysis, which began in October of 1978, and will continue through at least June of 1979. Flight tests call for checking the various modes of the EAR system in an environment closely approximating the SAC mission. The flight test will be managed by the Air Force Avionics Laboratory. All flights will originate at Boeing-Wichita and a Boeing flight test crew will fly the airplane. However, part of that crew will be radar experts from Westinghouse Corporation. Later in the flight test when all modes have been certified as operating correctly, SAC qualified crew members in both the Pilot and Radar Navigator positions will evaluate system performance and controls and displays. We expect to learn much from all aspects of the flight test. We also expect this technology to be the next generation radar system not only for the B-52 penetrator but for any future advanced aircraft given that strategic mission.

With that brief introduction, let me now provide you some background behind the Electronically Agile Radar development effort. Program development began in 1971 when Air Force realized that existing radar technology would probably not be sufficient to do the job in the environment postulated for the remainder of this century. During the next two years, studies were done using existing systems, existing development programs and experienced SAC qualified crewmembers in an effort to more precisely define strategic radar system requirements. Such parameters as radar range, terrain following/terrain avoidance requirements, crew position fix requirements, resistance to jamming, all weather feature, beacon/rendezvous and, air-to-air capability; and that all important parameter of reliability/maintainability were traded against each other to come up with the best balanced design system that technology would support. There was one other very important parameter factored into the design and that was cost. The entire system was to cost no more than $640,000 per copy in 1970 dollars. That was the predicted cost of the most modern offensive avionics system of that time period.

Continued on page 26

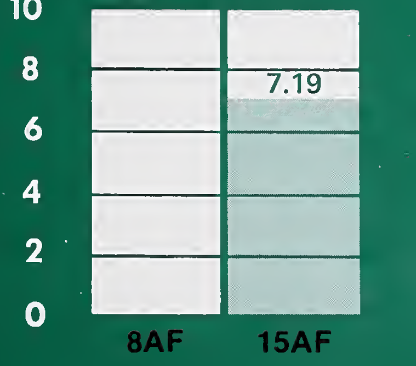
1979 Flying Safety Rate

SAC CLASS A MISHAP RATE (PER 100,000 FLYING HRS)



MISHAPS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1978	0	0	0	0	0	0	0	0	0	1	0	0
1979	1	0										

1979 SUBORDINATE CMD RATES

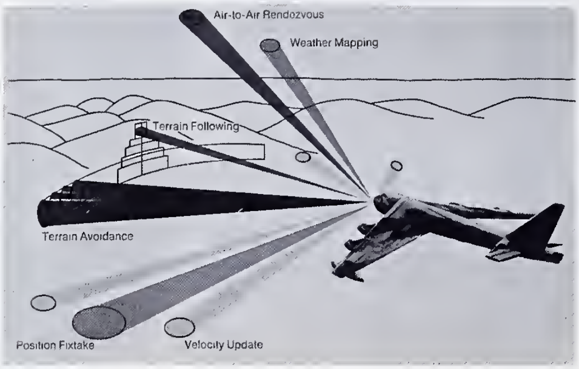


MISHAP STATUS

B-52H	JAN 79

LEGEND =1978 RATE

Continued from page 24



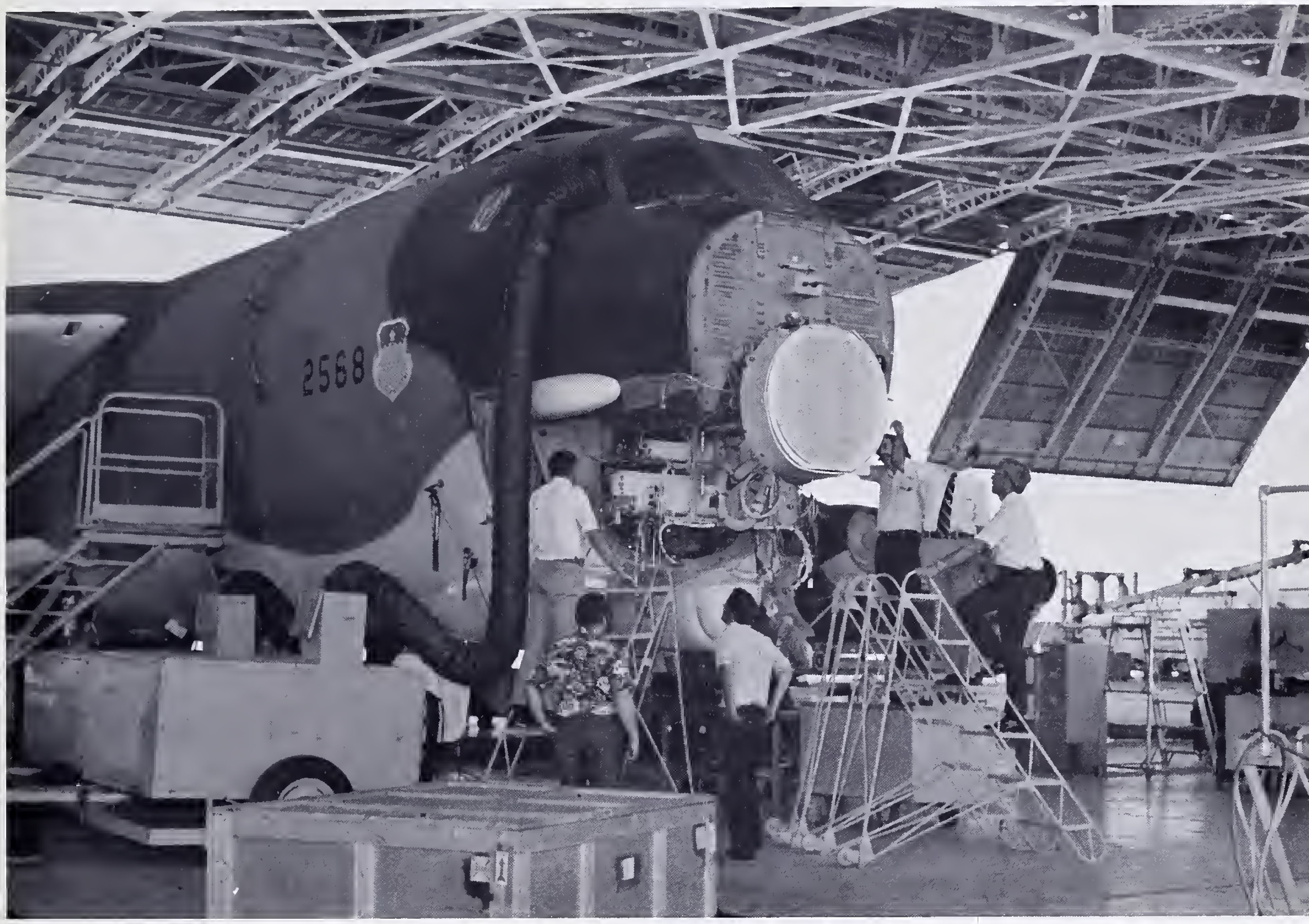
Artist's Conception — EAR with Multimodes

r&d corner

Actual hardware design for a system with these parameters stirred in began in May of 1974 — and SAC was a part of that design process from day one. That in itself is a departure from the norm, but we think it to be a significant one. The EAR system is now developed and, there are two prototypes in existence, one in test on board B-52G #0-2568 and the second is undergoing extensive ground tests on board a tower at the contractor facility. For the remainder of this short article, I will describe the radar itself and what we hope to accomplish during the flight test program.

The EAR system is a phased array multi-mode X band radar. The unique phased array antenna allows the radar to change the shape of its beam electronically without mechanical movement of the array. This electronic beam agility and digital processing combine to present rapid time-shared information of multiple modes which appear as simultaneous presentations to the crewmembers. The multiple modes include high resolution ground mapping, navigation update, velocity measurement, terrain following/avoidance, beacon and weather modes. The EAR system also has designed in growth provisions for a coherent, pulse doppler, air-to-air search and track mode. Key performance features include low, medium and high resolution radar mapping (actual resolution capability is classified) precise position update capability and a terrain following/avoidance capability that can use prescanned stored ground profile information which permits radar silent operation during most of the actual low altitude penetration time. At the same time, the EAR maintenance and reliability concept should substantially reduce costs and insure a higher probability of mission success. To keep this system affordable, significant initiatives were undertaken during the design process. The EAR design incorporates the capability to automatically detect faults through built-in-testing (BIT) functions and to isolate these faults (fault isolation test: FIT) to a low level assembly actually as electronic card within a hardware box. This feature means a potential for significant savings. Rather than spare hardware black boxes, less expensive electronic boards, many of which are common, can be spared. On-aircraft analysis also permits rapid swap out of malfunctioning boards in minimum time without the risks and wear and tear on cables that result from changing hardware black boxes.

So much for the system; we all know the first real advancement in radar navigation and weapon delivery capability since WW II took long enough to get here. Let's talk about what we are doing on the flight test. Special procedures and low level routes have been set up to evaluate EAR's low altitude capability. We are starting with terrain following in western Kansas, where the terrain is fairly benign, then moving to flat and rolling areas in western Oklahoma and finally to the mountainous areas within Colorado and New Mexico. Also, while in Kansas, the system will be evaluated with regard to ability to detect, measure and portray vertical obstructions. EAR is designed to portray vertical obstructions accurately out to a range of 10 Nautical Miles, permitting circumvention with ease. When we have adequate assurance the system can do this task we'll move into the less benign areas. We will also check the capability of the system to position fix accurately against a variety of returns. To measure autonomous system ability to precisely update we have the entire bomb-bay filled with an instrumentation system called CIRIS (Central Inertial Reference Instrumentation System). The CIRIS system depends on prelocated gound based transponders to determine aircraft position. With this system we can compare EAR derived position fix data with simultaneous CIRIS information and obtain position evaluation data approximately 10 times more accurately than could be provided via an RBS site.



B-52G/EAR During Installation

The EAR system, because of the increase in resolution capability, will also allow the crew to position fix against a whole new series of radar returns — actually locations that are not currently considered radar possible. Yes, during the flight test, we will fix against ridge lines and grain elevators, returns we presently use; but most position fix data will be done against dirt road intersections, small wooden bridges, small earthen culverts, single structures, etc. This capability implies some real advantages: first, these are the types of returns that as aiming points are always available on a world-wide basis; and second, these are the types of returns that will be very survivable in a wartime situation. One additional note, the quality of radar resolution has other significant payoffs in terms of reducing crew training and accomplishing some of the more subtle aspects of future B-52 missions (air alignment of inertials, conventional bombing, bomb damage assessment and sea surveillance.)

At the conclusion of the flight test, the system will be removed and returned to the contractor facility to undergo a final reliability growth testing program. This program will be conducted in a vibration, temperature and altitude environment simulating real world. These tests will then terminate with an assessment of the nuclear hardness capability designed into the system, again, the first time an airborne radar system has ever been designed to meet nuclear hardness specifications.

In summary, the radar system of the future is here. By the end of summer 1979, we expect to have enough flight test data to accurately assess the contribution of this system to mission effectiveness. One additional note for combat crew members, the EAR system has already been integrated with the Standard Precision Navigator (SPN) inertial, and we will be using the SPN inertial fully integrated during the flight test.

PROFESSIONAL PERFORMERS

Individuals selected for these pages as SAC's top professional performers of the month are chosen from nominations made by all SAC units. Selection is made only after all nominations have been carefully screened and those chosen meet the highest standards of excellence outlined in SACR 127-2.

SAC SAFETY MAN

TSgt Laiten G. Marney, 341st SMW, is SAC Safety Man of the Month. As wing explosive safety NCO he is responsible for licensing all munitions storage locations, insuring proper storage and handling of munitions items, inspecting the squadron explosive safety program of all base agencies handling explosive items and training all squadron additional duty explosives safety officers and NCO's. The effectiveness of his program is documented by no major discrepancies from the SAC IG and the Department of Defense Explosive Safety Board visits since 1975. As a squadron nuclear safety NCO, he has demonstrated vast knowledge. He tailored the nuclear safety lesson plan used to train all maintenance personnel in the two assigned squadrons. His knowledge and experience in all safety areas and his energetic drive and dedication have helped earn the wing an enviable explosive and nuclear safety record.

321st SMW, Crew E-033: MCCC Capt Gregory C. Muntzner, and DMCCC 2Lt Stephen M. Hasser.

MINUTEMAN CREW

On alert at a squadron command post, Crew E-033 experienced indications of environmental control system fault in the launch control center. They noted an odor of burning electrical wiring as smoke came from the front of the capsule and a series of loud sounds came from under the floor of the launch control center. Following up on indications, the motor generator was eliminated as the cause of the fire indications. Realizing that the air conditioner was on primary power prior to the overheat conditions, the crew tripped the proper circuit breakers isolating the AC side of the air conditioner and monitored to determine the effect of their actions. The smoke continued from the front of the capsule and upon checking for cooling air during the prescribed wait/monitor period, the crew determined that the capsule had lost the air conditioning unit and cooling air. The launch control officer maintained vigilance and the crew commander immediately began action to shut down the capsule due to loss of cooling air. After the commander completed shut down actions, the crew completed the fire checklist, insuring the fire was terminated and all indications eliminated. Their rapid response to this potentially critical situation prevented serious damage to other components in the multimillion dollar launch control center and insured their own personal safety. They are deserving of being selected as SAC Missile Crew of the Month.

TITAN CREW

As the 373rd SMS staff crew, Crew R-016's outstanding managerial abilities and superior system knowledge were demonstrated during a recent visit by the SAC IG. All squadron programs under their purview were found to be error free, and the security program was recognized as noteworthy by the evaluator. Further, the crew was tasked to provide an emergency war order certification briefing while being observed and evaluated by the IG Operations Chief. Comments in the formal report indicate that the crew possessed an excellent understanding of EWO concepts and procedures. Capt Hamilton and Lt Jouett also achieved perfect scores on an EWO test administered by the IG. Individually, all crewmembers manifest excellence in accomplishing assigned additional duties within their squadron. Their accomplishments warrant their recognition as a Crew of the Month.

308th SMW, Crew R-016: MCCC Capt Terry J. Hamilton, DMCCC 2Lt Terry R. Jouett, MSAT TSgt Jack E. Kingsley, and MFT SrA Danny L. Martin.

MAINTENANCE MAN

SSgt Rick L. Hanson, 44th OMMS, Ellsworth AFB, is SAC Maintenance Man of the Month. Sgt Hanson, as a missile maintenance team (MMT) chief, has established an enviable MMT evaluation record. His team's initial task evaluation by wing quality control resulted in 20 tasks being evaluated. Not only were all tasks passed, but 10 were rated "highly qualified." This excellent performance was again demonstrated during a HQ SAC evaluation of the wing's maintenance capability. His team was evaluated on a total of 24 tasks, all of which were rated "Qualified" or higher. In addition, his team is often called upon to demonstrate maintenance procedures. During the most recent occasion, they demonstrated the demating and mating of a Minuteman missile reentry vehicle to a tour group led by the U. S. National Security Advisor, Zbigniew Brzezinski, earning lavish praise for their highly professional performance. Sgt Hanson is a dedicated noncommissioned officer and a valuable asset to SAC maintenance and the United States Air Force.

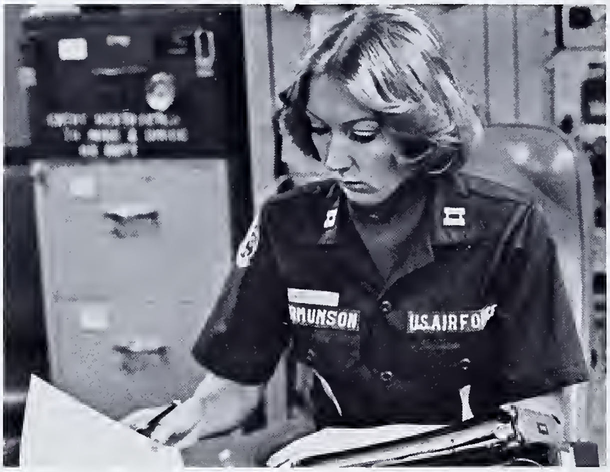
FLYING CREW

Crew E-10, of the 320th BMW, was flying a routine B-52 training mission at a speed of 350 KTAS and at TA altitude of 750 feet AGL. The pilot had just initiated a shallow right turn into the initial point for the first bomb release when the aircraft experienced a birdstrike on the center windscreen. A duck struck the window with sufficient force to completely shatter both outer and inner safety panes. Pieces of glass were sent flying throughout the crew compartment, many landing as far back as the defense station. No injuries were sustained because all crewmembers were following recommended safety procedures and flying with their helmet visors down.

320th Bomb Wing Crew E-10: (left to right) 1Lt John Hurth, copilot; Capt Robert Maddox, pilot; Capt Terry Rock, radar navigator; Sgt Mark Lough, gunner; Capt Brad Mercer, electronic warfare officer; and 1Lt Dave Gibson, navigator (not pictured).

Immediately following the strike, the pilot rolled out on planned heading and began a climb to IFR altitude using instruments, while the copilot visually cleared for other aircraft and additional birds. The radar navigator assumed low level navigation as the navigator quickly developed a diversion course to the nearest emergency alternate. Once at altitude, Dash One emergency procedures were followed and the aircraft was successfully recovered at Minot AFB. Due to the combined professional efforts of Crew E-10 a more serious low altitude mishap involving critical SAC resources was avoided.

DEBRIEF



FIRST IN SAC

Capt Deborah L. Jermunson became the first woman in SAC to attain the position of missile combat crew commander when the 390th SMW recently named her to that job. In this position, she commands a Titan II missile, its facility, and crew.

As those who preceded her, and those that will follow, Capt Jermunson was trained, tested, evaluated and certified in every aspect of her job. In addition to her experience as a deputy missile combat crew commander, she spent several weeks of intensive training in the missile procedural trainer, at the missile sites and in the classroom. She was then evaluated and received a near perfect score. Finally, she was certified in emergency war order procedures by Col Charles H. Greenley, 390th SMW commander on January 5, 1979, and the following day she was on alert. One among many who give their best every day for SAC.

HISTORIC LIFT

During this year's RAF Giant Voice detachment to Barksdale AFB, large boards depicting the history of the RAF Squadrons involved were displayed. Naturally, such valuable and attractive items were 'borrowed' by other participating USAF crews and have probably found their final resting place adorning the wall of one of your squadron's crewrooms.

We are delighted that the USAF shows such great interest in our squadron's past and only hope that our board, in particular, is currently disposed in a position fitting to its contents and standing.

We would be extremely grateful if, through your publication, the whereabouts of our 'Squadron's History' could be established and perhaps the triumphant crew could send us a photograph of their trophy in its new surroundings.

Flt. Lt. A. H. Leitch RAF
No. 44 (Rhodesia) Squadron
Royal Air Force
Waddington, Lincoln, England

SAC SAFETY SCREEN

97 AREFS, Blytheville Crew E-107: P Capt Leo A. Brownyard, CP 1Lt Rodney A. Deweese, NN 1Lt David J. Kramer, BO TSgt Louis Yablonka

340 BMW, Blytheville Crew S-21: P Capt Ronald G. Boyette, CP Capt David G. Aldrich, RN Capt James A. Bowden, NN Capt Jonathan C. Hantke, EW Capt Thomas W. McDonald, AG Sgt Russell B. Combs

920 AREFS, Wurtsmith Crew E-107: P Capt Michael H. Laney, CP 1Lt Mark J. Meyers, N 2Lt Evan H. Ashby, BO Sgt Kevin R. Holmgren

524 BMS, Wurtsmith Crew E-22: P Capt Joe L. Frost, CP Capt Joel R. Caudle, RN Capt Bill Voss, N Capt Fred L. Swann, EW 1Lt Jimmie Reeves, AG SSgt George Turner

68 BMW, Seymour Johnson Crew R-09: P Capt Donald D. Karle Jr., CP Capt Fredrick R. Mathews, RN Capt Terry G. Coney, NN Capt Richard D. Evans, EW 1Lt Thomas E. Johnson, AG Sgt Homer J. Heath Jr

911 AREFS, Seymour Johnson Crew E-107: P Capt Author Laird, CP 1Lt Greg D. Collier, NN Capt Arnold W. Howard, BO A1C Daniel C. Duncan

912 AREFS, Robins Crew S-102: IP Capt Albert F. Fahy III, CP Capt Fredrick J. Heberle, IN Capt William J. Moran Jr, IS TSgt William E. Mullis

912 AREFS, Robins Crew R-118: P Capt Conrad O. Chapman, CP Capt Thomas L. Barnes, NN 1Lt Theodore E. Derrick, BO Sgt Willia J. Hillery

28 BMS, Robins Crew E-15: P Capt Thomas A. Tonge, CP 1Lt Taylor A. Slate, NB Capt Malcolm W. Roe, NN Capt David C. Gooden, NE Capt Randall E. Wright, IS Sgt James R. Jackson

668 BMS, Griffiss Crew E-12: P Capt James T. Acklin, CP 1Lt William L. Martin III, RN Capt John F. Crandley Jr, NN 1Lt Victor M. Hernandez Jr, EW 1Lt Javier A. Reyes, AG A1C Ralph R. Saviola

320 BMW, Mather Crew E-10: P Capt Robert M. Maddox, CP 2Lt Robert Miller, RN Capt Terrance J. Rock, N Capt Gary L. Franzen, EW Capt Bradford Mercer, G Sgt Mark A. Lough

92 BMW, Fairchild Crew E-32: P Capt Thomas D.Rudolph, CP Capt Stanley G. Silverman Jr, RN Capt Don G. Arnold, N Capt Thomas D. Bertrand, EW Capt Robert C. Socik, G SSgt Richard L. Scanlan

9 SRW, Beale Crew E-011: P Maj Thomas J. Keck, RSO Capt Timothy J. Shaw

916 AREFS, Travis Crew R-104: P Capt Wolfgang E. K. Gesch, CP 1Lt Brian M. Barnes, NN 1Lt Jay D. D. Kleven, BO MSgt Raymond D. Miller

93 BMW, Castle Crew IT-40: IP Capt Michael W. Mankin, IN Capt Fred H. Guice, IEW Capt John P. Sladin, IG SSgt Robert N. Leach

28 BMW, Ellsworth Crew E-110P: IP Capt Michael L. Manning, CP Capt Clyde T. Anderson, N 1Lt Alvin W. Peterson, BO A1C David L. Mangan

5 BMW, Minot Crew E-07: P Capt Fred A. Bieber Jr, CP 1Lt John W. Storer, RN Capt John R. Snell, N Capt Robert L. Rottman, EW 1Lt Gene A. Spencer, G TSgt Danny L. Herzner

44 SMW, Ellsworth Crew E-055: MCCC 1Lt Connie W. Johnson, DMCCC 1Lt Ricky J. Rea

90 SMW, F E Warren Crew E-051: MCCC Maj Marvin W. Smith, DMCCC 1Lt James W. Davis

351 SMW, Whiteman Crew R-144: MCCC 1Lt Robert C. Holley, DMCCC 2Lt Richard D. Tinkler

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1979-665-046/1

UNIVERSITY OF FLORIDA
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HALL OF FAME

TACTICAL FLYING

OVER TWENTY-THREE YEARS

170 AREFG, McGuire (NJANG)	NONE

OVER TWENTY YEARS

171 AREFW, Greater Pittsburgh (PAANG)	Mar '58
157 AREFG, Pease (NHANG)	Jun '58
97 BMW, Blytheville	Aug '58

OVER NINETEEN YEARS

940 AREFG, Mather (USAFR)	May '59
307 AREFG, Travis	Sep '59

OVER EIGHTEEN YEARS

19 BMW, Robins	Oct '60
151 AREFG, Salt Lake City (UTANG)	Feb '61

OVER SEVENTEEN YEARS

161 AREFG, Sky Harbor (AZANG)	Apr '61
126 AREFW, Chicago O'Hare (ILANG)	Apr '61
134 AREFG, McGhee Tyson (TNANG)	Aug '61
340 AREFG, Altus	Feb '62

OVER SIXTEEN YEARS

301 AREFW, Rickenbacker	Jul '62
96 BMW, Dyess	Aug '62

OVER FOURTEEN YEARS

160 AREFG, Rickenbacker (OHANG)	Dec '64

OVER THIRTEEN YEARS

320 BMW, Mather	Jul '65

OVER TWELVE YEARS

452 AREFW, March (USAFR)	Sep '66
92 BMW, Fairchild	Feb '67

OVER ELEVEN YEARS

55 SRW, Offutt	Jul '67
2 BMW, Barksdale	Aug '67

OVER TEN YEARS

5 BMW, Minot	Feb '69

OVER NINE YEARS

42 BMW, Loring	Sep '69
141 AREFW, Fairchild (WAANG)	Oct '69

OVER EIGHT YEARS

28 BMW, Ellsworth	May '70

OVER SIX YEARS

7 BMW, Carswell	Mar '72
101 AREFW, Bangor (MEANG)	Mar '72
416 BMW, Griffiss	May '72
305 AREFW, Grissom	Aug '72
376 SW, Kadena	Nov '72

OVER FIVE YEARS

379 BMW, Wurtsmith	Apr '73
100 AREFW, Beale AFB	Feb '74

OVER FOUR YEARS

384 AREFW, McConnell	Mar '74
189 AREFG, Little Rock (ARANG)	May '74
43 SW, Andersen	Dec '74

ICBM

OVER FOURTEEN YEARS

90 SMW, F E Warren	Jul '64
1 STRAD, Vandenberg	Sep '64

OVER THIRTEEN YEARS

308 SMW, Little Rock	Aug '65

OVER EIGHT YEARS

341 SMW, Malmstrom	Apr '70

OVER FIVE YEARS

390 SMW, Davis-Monthan	Jul '73

OVER FOUR YEARS

351 SMW, Whiteman	Oct '74
91 SMW, Minot	Nov '74

To gain listing in the Hall of Fame, a SAC or ARF unit must be Class A mishap-free for 48 months